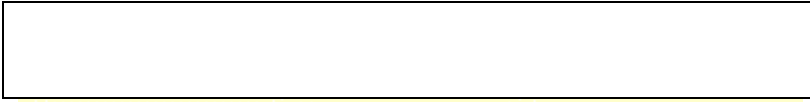


Projectile problem 1 A projectile is fired straight off of a 100 m high cliff at 50 m/s. Find



- a) the time it takes to hit the ground
- b) the horizontal distance it will travel
- c) The velocity when it hits the ground.

- a) Use $y = v_{iy}t + \frac{1}{2} a_y t^2$
- b) Use $V_x = dx/t$
- c) Use for $V_{y\text{final}}$: $V_f = V_i + at$

Then add head to tail with Puthagorean theorom to find the total V final

Projectile problem 2

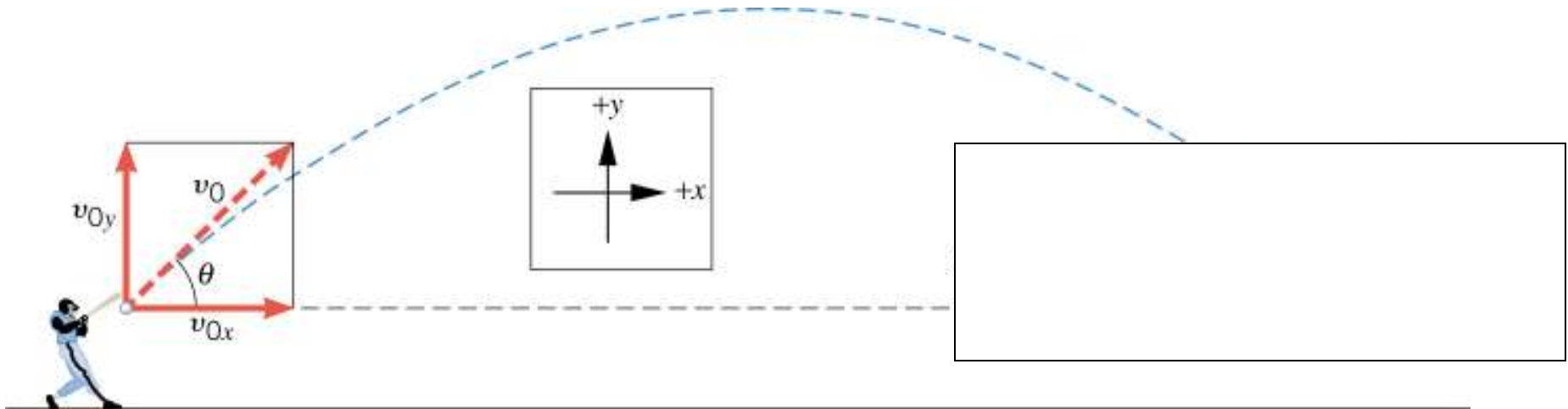
A ball is hit at a 36° angle upward and leaves the bat at 25 m/s. Find

- a) the initial horizontal speed b) the initial vertical speed c) the time it takes to hit the ground
d) the height it will travel e) the horizontal distance it will travel

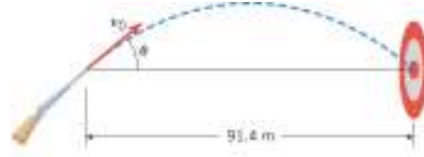
a) Use $V_x = 25 \cos 36$ b) Use $V_y = 25 \sin 36$

c) Use $V_{fy} = 0 = V_{iy} + at$ d) Use $dy = 0 + \frac{1}{2} at^2$

e) Use $dx = (V_x)t$



Hints for 2D projectile problems



Cutnell & Johnson
Wiley Publishing
Physics 5th Ed.
Problem 03.71 (W132)
C M E

- Separate given data into **x** and **y**.
- Finding **time in the air** is a good first step. Find an equation with **t** and the things you are given.
- a_y is always 9.8 m/s^2 .
- Sometimes $V_x = 0$ or $V_y = 0$.
- V_y always equals zero at the top of a parabola.

